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EXAMINER	
VLAHOS, SOPHIA	
ART UNIT	PAPER NUMBER
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/28/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/954,663	LYLE ET AL.	
	Examiner	Art Unit	
	SOPHIA VLAHOS	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 February 2006.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-32,34-55,57-81,86-90 and 95-143* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *31,32,34,53-55,60-64,100 and 132-143* is/are allowed.

6)☒ Claim(s) *See Continuation Sheet* is/are rejected.

7)☒ Claim(s) *3,6-7, 11, 13-14, 38-39, 45-46, 50, 58, 67, 73, 75, 79-80, 87-88, 96-98, 108-109, 121, 126-129, 131,* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 12 September 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 9/12/01, 12/23/02, 12/03/04.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Disposition of Claims: Claims rejected are 1-2, 5, 8-10, 12-15-30, 35-37, 40-44, 47-49, 51-52, 57, 59-65-66, 68-72, 74, 76-78, 81, 86, 89-90, 95, 99, 101-107, 110-125, 130 .

DETAILED ACTION

Allowable Subject Matter

1. The previously indicated allowability of claims 1-3, 5-29, 35-81, 95-143 is withdrawn in view of the newly discovered reference(s) to the "Digital Visual Interface DVI", 1999 document , Pasqualino (U.S. 2002/0163598) and Grigorian (U.S. 6,724,432). Rejections based on the newly cited reference(s) follow.

Specification

2. The revised abstract received on 8/2/2005 is acceptable

3. The amendment to the specification received on 8/2/2005 is acceptable.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "transmitter is configured to transmit auxiliary data to the receiver by modulating DC disparity of a channel of the communication link, as recited in claim 1 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Also, the " wherein the data structure of each of the words having nonzero DC disparity is indicative of whether said each of the words has been encoded in accordance with the first encoding operation or the second encoding operation, of claim 23 must be shown or the feature(s) canceled from the claim(s) since the above is

essential in the understanding the operation of claim 23. Also claim 23 mentions two (possible) encoding operations and Fig. 29 shows auxiliary data encoded by two encoders (but it is not clear if Fig. 29 illustrates the claimed subject matter of claim 23)).

Claims 28, 29, 31 contain limitations similar to those of claim 23 (with respect to the two possible encoding operations) and it is not clear which Figure (if any) illustrates the inventions claimed in claims 28, 29, 31.

With respect to claim 53, claim 53 recites: "...the transmitter is configured to transmit encoded words indicative of auxiliary data to the receiver over the link, at least one bit of each of the encoded words determines at least one auxiliary data bit, and the remaining bits of said each of the encoded words determine a word of the video data..." which is not shown in Fig. 29 since in Fig. 29 the video data and auxiliary data are transmitted separately.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Oath/Declaration

5. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration (received on 9/12/2001) is defective because: None of the inventors has signed the declaration received on 9/12/2001.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 23-30, 112-121 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in

the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

With respect to claim 23, claim 23 recites: "...each of the words is indicative of auxiliary data and includes a data structure, each of the words having nonzero DC disparity is encoded in accordance with one of a first encoding operation and a second encoding operation, and each of the words having zero DC disparity is encoded with the first encoding operation, and wherein the data structure of each of the words having nonzero DC disparity is indicative of whether said each of the words has been encoded in accordance with the first encoding operation or the second encoding operation..." Based on the above, two possible encoding operations can take place at the transmitter, but the specification (page 47 line 15 mentions a modified encoding algorithm that replaces the conventional balancing rule with a loosened one) does not disclose in sufficient detail the first, second encoding as well as how the data structure of each of the words having nonzero DC disparity has been encoded in accordance with the first or the second encoding operation. Also Fig. 29, showing encoding of auxiliary data does not disclose any details that enable a person skilled in the art to make and/or use the invention.

Dependent claims 24-27 are also rejected since they contain the limitations of claim 23.

Claims 28-30 are rejected under a similar rationale to the one used in the rejection of claim 23 since these claims 28-30 contain limitations similar to those of claim 23.

With respect to claim 112, claim 112 recites: "..., and said at least one of the transmitter and the receiver is configured to transmit a signal indicative of auxiliary data to the other of the transmitter and the transmitter over the conductor pair by common mode modulation of said conductor pair." The specification, (page 70, lines 29-34) only mention transmission of auxiliary data using "phantom" (common mode) modulation of a conductor pair. The claimed "to transmit a signal indicative of auxiliary data ... by common mode modulation of said conductor pair", is not described in the specification in a manner that enables person skilled in the art at the time of the invention, to make the invention of claim 112.

Dependent claims 113-115 are also rejected since they contain the limitations of claim 112.

Claim 116 also mentions "common mode modulation" and is rejected for reasons similar to those presented above with respect to claim 112,

Dependent claim 117 is also rejected since it contains the limitations of claim 116.

Claim 118 recites: "..such that modulation of the common mode level of the differential signal as a function of time is indicative of said auxiliary signal...". However, "modulation of the common mode level of the differential signal as a function of time" is not described in the specification in a manner that enables person skilled in the art at the time of the invention, to make the invention of claim 118.

Dependent claim 119 is also rejected since it contains the limitations of claim 118.

With respect to claim 120, claim 120 recites: "... wherein the difference between the first common mode level and the second common mode level determines a third differential signal, and the third differential signal is indicative of the auxiliary data." The specification (page 65 for example) mentions the above but it there is no description (of Figure) that would allow a person skilled in the art at the time of the invention to make the invention of claim 120.

Dependent claim 121, is also rejected since it contains the limitations of claim 120.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-3, 5-32, 34-51, 53-55, 57-81, 86-90, 95-143 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The aforementioned claims include the limitation: "TMDS-like communication link" or "TMDS-like link" (contain the "TMDS-like" term). Page 6, lines 27-32 of the specification mention that a TMDS-like link could be a TMDS link or a link that has some but not all of the characteristics of a TMDS link (could also be an LVDS link as mentioned on line 34 of the same page). Therefore, the "TMDS-like" term is indefinite and it the scope of the protection sought by the applicant over the claims that include the "TMDS-like" is vague and indefinite.

In addition, claim 15, recites: "transmitting a stream of data words over at least one channel of the link thereby modulating DC disparity of the channel," the meaning of term "thereby" is unclear, since "thereby" is understood to mean "because of that". Therefore, claim 15 is interpreted as: transmitting a stream of data words over at least one channel of the link (and) because of that (the transmitting of data over the channel of the link?) modulating DC disparity of the channel, such that the DC disparity is indicative of auxiliary data. Clarification of claim 15 is required

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 1-2, 5, 8-12, 15-21, 36-37, 42-44, 47-49, 68, 74, 76, 81 are rejected under 35 U.S.C. 102(b) as being anticipated by "Digital Visual Interface DVI" revision 1.0., 1999 (hereafter referred to as the "DVI document").

With respect to claim 1, the DVI document discloses: a transmitter (see Fig.2.1 TMDS Transmitter block on page 10, and Fig. 3.1. on page 24 includes more details regarding the TMDS transmitter architecture); a receiver (Fig. 2.1 TMDS Receiver block on page 10, and Fig. 3.1 on page 24 includes more details regarding the TMDS receiver architecture); a TMDS-like communication link between the transmitter and the receiver, wherein "TMDS" denotes "transition minimized differential signaling," (see TMDS link between transmitter and receiver, where the TMDS link is an example of a TMDS-like link) the transmitter is configured to transmit auxiliary data to the receiver by modulating DC disparity of the channel of the communication link (see section 3.1.4 Encoding on page 25, last sentence the first paragraph of the 3.1.4 section and the last paragraph of section 3.1.4. where the second stage of encoding performs the DC balancing based on

the running disparity and the number of ones and zeros of the current code word, the tenth bit added to the code word is considered as the auxiliary data since it indicates whether an inversion or not has taken place (and is used by the receiver to undo the inversion performed at the transmitter, see last sentence of last paragraph of section 3.1.4.))

With respect to claim 2, all of the limitations of claim 2, are analyzed above in claim 1, and the DVI document further discloses: wherein the transmitter is configured to transmit a stream of encoded data words over the channel (see section 3.1.4. Encoding, page 25 the encoded TMDS signals transmitted over the data channels (see section 3.1. overview on page 24, and Fig. 3.1.)), the words determine the video data (see Fig. 3.1. overview on page 24, the video pixel data) and include bits indicative of accumulated DC disparity of the stream (see last paragraph of section 3.1.4. on page 25, where the 10th bit of the current code word, is determined based on the running disparity and the current number of ones and zeros (this corresponds to the claimed accumulated DC disparity) since at the encoder it is attempted to maintain approximate DC balance of the (video) stream and the decision on whether to invert or not the next TMDS character depends on the running disparity and the 1s and 0s of the current codeword), and said bits determine the auxiliary data (the 10th bit is the considered as the auxiliary data since is used by the receiver to undo the inversion performed at the transmitter, see last sentence of last paragraph of section 3.1.4.)).

With respect to claim 5, all of the limitations of claim 1, are analyzed above in claim 1, and the DVI document discloses: wherein a sequence of instantaneous values of the DC disparity determines the auxiliary data (see last paragraph of section "3.1.4 Encoding" on page 25, for data channels 0-2 where the encoded video data is transmitted, the sequence of instantaneous values of DC disparity corresponds to the DC disparity of each current data word based on which (and the running disparity) the value of the 10^{th} bit (the auxiliary data of the current code word) is determined).

With respect to claim 8, all of the limitations of claim 8,are analyzed above in claim 1, and the DVI document discloses: wherein the auxiliary data determine at least one control signal (see last paragraph of section 3.1.4. Encoding on page 25, the inversion at the receiver is performed (or not) (i.e. controlled) based on the value of the auxiliary data (the 10^{th} bit of the TMDS code word)).

With respect to claim 10, the DVI document discloses: a transmitter (Fig. 3.1. on page 24, block labeled TMDS Transmitter); a receiver (Fig. 3.1. on page 24, block labeled TMDS Receiver); and a TMDS-like communication link between the transmitter and the receiver (Fig. 3.1, the TMDS link between the TMDS Tx and Rx), wherein "TMDS" denotes "transition minimized differential signaling" the transmitter is configured to transmit video data over the link to the receiver (see Fig. 3.1. the video pixel data and last paragraph of section 3.1.1 on page 24), at least one of the transmitter and the receiver is configured to transmit a stream of data words determining auxiliary data over

the link to the other one of the transmitter and the receiver (see section 3.1.4. Encoding, the transmitter transmits the TMDS coded characters that determine auxiliary data at the receiver since the TMDS characters include information on whether that data bits have been inverted or not), and a data structure of each of at least a subset of the words is indicative of DC disparity (the 10^{th} bit of the transmitted TMDS character, the at least a subset of the words corresponds to all of the transmitted TMDS characters), and wherein the auxiliary data are determined by one of a sequence of values of the DC disparity (see last paragraph of section 3.1.4 Encoding where the value of the auxiliary data of the current code word is determined based on the running DC disparity and the number of ones and zeros of the current code word i.e. a sequence of values of the DC disparity) and a sequence of differences between successive ones of the values of the DC disparity.

With respect to claim 12, all of the limitations of claim 12 are analyzed above in claim 10, and the DVI document discloses: wherein the transmitter is configured to transmit the stream of encoded data words over a channel of the link, the data words of the stream are encoded data words that determine the video data and have an accumulated DC disparity (see last paragraph of section 3.1.4 Encoding on page 25, the running DC disparity and the current number of ones and zeros of the current code word correspond to the accumulated (total) DC disparity), each said data structure has at least one bit indicative of a value of the accumulated DC disparity (the value of the 10^{th} bit of the most current TMDS character), and a sequence of instantaneous values

of the accumulated DC disparity determines the auxiliary data (for every 10-bit TMDS code word received sequentially at the receiver, the value of the 10^{th} bit indicates whether an inversion or not has been performed at the transmitter i.e. this is auxiliary data (information) used by the receiver to undo the inversion (or not) performed at the transmitter).

With respect to claim 15, the DVI document discloses: (a) transmitting a stream of data words over at least one channel of the link thereby modulating DC disparity of the channel (Fig. 3.1. on page 24, block labeled TMDS Transmitter, and see section 3.1.4 Encoding on page 25), such that the DC disparity is indicative of auxiliary data (the 10^{th} bit is considered to correspond to auxiliary data, see section 3.1.4 Encoding); (b) recovering the auxiliary data from the transmitted stream of data words (Fig. 3.1. on page 24, block labeled TMDS Receiver, where the receiver recovers the data sent over the TMDS link, and see last sentence of section 3.1.4 where based on the 10^{th} bit (auxiliary data) the receiver/decoder perform an inversion (or not) of the input code word).

With respect to claim 16, all of the limitations of claim 16, are analyzed above in claim 16, and the DVI document discloses: wherein the data words are encoded words indicative of video data, and also including the step of: (c) decoding the transmitted data words to recover the video data (see Fig. 3.1. on page 24, block labeled TMDS Receiver, recovers the (video) pixel data).

With respect to claim 17, all of the limitations of claim 17, are analyzed above in claim 15,and the DVI document discloses: wherein the data words include disparity bits indicative of accumulated DC disparity of the stream, and the stream, and wherein step (b) includes the step of recovering the auxiliary data from the disparity bits of the transmitted stream of data words (see last sentence of section 3.1.4 Encoding where based on the 10th bit (auxiliary data) the receiver performs an inversion of the received code word)).

With respect to claim 18, the DVI document discloses: an input for receiving auxiliary data(see Fig.3.1, on page 24, Transmitter side, the "control data" stream, and see Table 2.6 on page 23, "Signal List", see signal Hot Plug Detect under control signals, and this is considered as the auxiliary data received by the transmitter with information on whether a monitor is connected); an output configured to be coupled to a channel of the link (see Fig. 3.1., the block TMDS Transmitter has outputs (channels 0-2, Channel C) connected to the TMDS link); and circuitry coupled to the input and configured for generating an output signal in response to the auxiliary data (see last paragraph of section 3.1.1. Link Achitecture, where it is mentioned that the transmitter includes three encoders (i.e. circuitry coupled to the input) and clearly the encoders encode data to be transmitted when a monitor (a receiver) is connected, therefore the output signal is generated in response to the auxiliary data (the Hot Plug Detect signal)), and asserting the output signal to the output for transmission over the channel wherein

the output signal modulates DC disparity and is indicative of the auxiliary data (see section 3.1.4 Encoding , especially last paragraph for the output signal modulating DC disparity, and the output signal is indicative of the auxiliary data merely by its transmission, since there would be no output signal if a monitor was not presently connected).

With respect to clam 19, all of the limitations of claim 19 are analyzed above in claim 18, and the DVI document discloses: wherein the transmitter also has a video input for receiving video data, and output signal is also indicative of the video data (see Fig. 3.1. the input (video) pixel data at the Transmitter side, that are TMDS encoded and transmitted –output signals - over Channels 0-2 of the TMDS link, see last two paragraph of section 3.1.1. on page 24).

With respect to claim 20, all of the limitations of claim 20 are analyzed above in claim 19, and the DVI document discloses: wherein the circuitry (the three encoders contained in the transmitter) is coupled to the video input and configured to generate encoded video data indicative of the video data (the encoders perform TMDS encoding see last paragraph of section 3.1.1 on page 24), the output signal comprises a stream of sequentially transmitted data words (see each one of the serial TMDS channels mentioned on the first sentence of last paragraph of section 3.1.1. the words are 10-bit TMDS characters), each of the words is indicative of a quantity of the encoded video data (the 10-bit TMDS characters include 8 (video) pixel bits are, see last paragraph of

section 3.1.1) , and each of at least some of the words is indicative of the accumulated DC disparity of the stream (all of the transmitted words contain information regarding the accumulated DC disparity see last paragraph of 3.1.4 Encoding on page 25).

With respect to claim 21, all of the limitations of claim 21, are analyzed above in claim 18, and the DVI document discloses: wherein the transmitter is implemented as an integrated circuit (see last paragraph on page 26, approximately middle of it, where transmitter chips are mentioned).

With respect to claim 36, the DVI document discloses: a receiver (see Fig. 3.1.on page 24, TMDS Receiver block); a transmitter (see Fig. 3.1. on page 24, TMDS Transmitter block); and a TMDS-like communication link between the transmitter and the receiver, wherein "TMDS" denotes "transmission minimized differential signaling" (see TMDS link between transmitter and receiver on Fig. 3.1) the transmitter is configured to transmit video data over the link to the receiver (pixel data see Fig.3.1), the link includes at least one multi-purpose line (not shown, the DDC link, see section 2.2.6, DDC on page 15, where the DDC link includes a power connections, the DDC link issues DDC1 transactions, and EDID data, see also the first paragraph of 2.2.1 Overview on page 10) the transmitter and the receiver are operable in a first mode in which one of the transmitter and the receiver transmits a first signal indicative of auxiliary data over at least one multi-purpose line to the other one of the transmitter and the receiver (see page 10, first paragraph of section 3.1.1. overview, where the

transmitter (a computer) queries (this is the first mode) the receiver (monitor) using the DDC2B protocol to determine what pixel formats and interface is supported) and the receiver operable in a second mode in which one of the transmitter and the receiver transmits a second signal over the at least one multi-purpose line to the other one of the transmitter and receiver (see section 2.2.6.2 Monitor DDC Requirements, on page 15, when the receiver (monitor) responds to the transmitter query over the DDC link).

With respect to claim 37, all of the limitations of claim 37, are analyzed above in claim 36, and the DVI document discloses: wherein the at least one multi-purpose line is at east one downstream device status line (the DDC link/line mentioned above in the rejection of claim 36), the second mode is a monitoring mode in which the transmitter monitors the at least one downstream device status line to determine whether a downstream device is coupled to the receiver (this corresponds to the transmitter waiting for a response from the receiver (monitor), also mentioned above in the rejection of claim 36), and the first mode is an auxiliary data transmission mode in which the transmitter transmits the first signal over the at least one downstream status line to the receiver (see section 2.2.1 overview first paragraph on page 10, also mentioned above in the rejection of claim 36, the transmitter inquires for the capabilities of the receiver(monitor)).

With respect to claim 42, the DVI document discloses: a first input for receiving auxiliary data (DDC input, of the transmitter see section 2.2.1 Overview on page 10, the

DDC link where system capabilities are communicated between the Tx and Rx) at least one video input for receiving video data (see Fig. 3.1. the transmitter side receives video pixel data); a first output configured to be coupled to a channel of the link (see outputs of TMDS Transmitter and channels 0-2); a second output configured to be coupled to the downstream device status line (the DDC link, see section 2.2.6 on page 15) ; circuitry, coupled to the first input and to the video input, and configured to generate a video signal indicative of at least some of the video data and to assert the video signal to the first output for transmission over the channel (see Fig. 3.1. circuitry comprising the encoders contained in the TMDS transmitter block as shown in Fig. 3.1, see last paragraph of section 3.1.1), and to generate a second output signal indicative of the auxiliary data and to assert the second output signal to the second output for transmission over the downstream device status line channel (see section 2.2.1 on page 10 where DVI supports DDC2B protocol and EDID data structure for communicating receiver (monitor) capabilities); and additional circuitry coupled to the second output and operable in a monitoring mode in which said additional circuitry monitors the downstream device status line and to determine whether a downstream device is coupled to the receiver (see paragraph 3 of page 11, the Hot-Plug Detection mechanism, and section 2.2.9 starting on page 16 that detects monitor attachment/removal) .

With respect to claim 43, the DVI document discloses: a receiver (Fig. 3.1 the Rx block); a transmitter (Fig. 3.1, the Tx block); and a TMDS-link communication link

between the transmitter and the receiver (TMDS link between Tx and Rx), wherein "TMDS" denotes "transition minimized differential signaling," the transmitter is configured to transmit video data over a video channel of the link to the receiver (see Fig. 3.1 on page 24, (video) pixel data are transmitted over the TMDS link), wherein the link includes an additional channel for bidirectional communication between the transmitter and at least one of the receiver and a device associated with the receiver (the DDC channel/link used for communication between the Tx and Rx (monitor), see section 2.2.6 on page 15, and see section 2.2.1 overview on page 10), and wherein at least one of the transmitter and the receiver is operable in a mode in which it transmits auxiliary data over the additional channel to the other one of the transmitter and the receiver (see section 2.2.1 overview, where the DDC link is used by the transmitter to inquire the system capabilities of the receiver (monitor) (and EDID data structure is used to identify the monitor capabilities)).

With respect to claim 44, all of the limitations of claim 44 are analyzed above in claim 43,and the DVI document discloses: wherein the additional channel is a serial bus configured to allow bidirectional communication between the transmitter and a monitor associated with the receiver, including information from the receiver to the transmitter of monitor identification data specifying characteristics of the monitor (see section 2.2.1. overview and the bidirectional channel is the DDC channel (more details found in section 2.2.6), and monitor type and system capabilities are identified).

With respect to claim 47, the DVI document discloses: a first input for receiving auxiliary data; at least one video input for receiving video data (no details are shown, but see Fig.3.1. on page 24, see Transmitter side, video (pixel) data input); a first output configured to be coupled to the video channel (Fig.3.1 see TMDS Transmitter coupled to the input and output channels); a second output configured to be coupled to the first channel (see any one of the channels 0-2 coupled to the TMDS transmitter and DDC link (not shown in Fig. 3.1 but mentioned in section, the DDC link enables bidirectional communication between the transmitter (a personal computer) and the receiver (a monitor)); and circuitry, coupled to the first input, the video input, the first output, and the second output, and configured to generate a video signal indicative of at least some of the video data and assert the video signal to the first output for transmission over the video channel (see TMDS transmitter block and last paragraph of section 3.1.1 as well as Fig. 3.1), and to generate a second output signal indicative of the auxiliary data and assert the second output signal to the second output for transmission over the first channel (the first channel can be the DDC link, that the transmitter uses to query information from the receiver (monitor) and this corresponds to the auxiliary data) wherein the circuitry is also configured to recover any of the device identification data received at said second output (the receiver receives from the monitor information about supported pixel and configuration information).

With respect to claim 48, the DVI document discloses: a receiver (see Fig. 3.3. , Receiver side on page 27); a transmitter (see Fig. 3.3 on page 27, Transmitter side);

and a TMDS-like communication link between the transmitter and the receiver (see Fig. 3.3. Dual TMDS link), wherein "TMDS" denotes "transition minimized differential signaling," the link comprises at least two video channels (see Fig. 3.3. each one the TMDs links has at least one video channel, therefore the two TMDS links have at least two video channels), the transmitter is operable in a first mode in which it transmits video data to the receiver over a first subset of the video channels but not a second subset of the video channels (see Fig. 3.3. in the case where the first TMDS link is associated with a powered-up monitor (receiver) ie, the transmitter sends video data to it over at least one of the video channels of the first link, and the second TMDS link is associated with a second monitor that is powered off (i.e. no video is sent there))) the transmitter is operable in another mode in which it transmits video data to the receiver over all of the video channels (see Fig. 3.3, this is the case when two monitors are connected over the respective TMDS links (and function, so that they receive the transmitted data) and the transmitter is configured to transmit auxiliary data to the receiver over the second subset of the video channels during the first mode (see Fig. 3.3 the common CLK channel, sending the clock channel to the receiver (monitor)).

With respect to claim 49, all of the limitations of claim 49, are analyzed above in claim 48, and the DVI document discloses: wherein the TMDS-like communication link is a Digital Video Interface comprising a first TMDS link and a second TMDS link, the first TMDS link includes the first subset of the video channels, and the second TMDS

link includes the second subset of the video channels (see Fig. 3.3. dual link TMDS first and second TMDS links).

With respect to claim 68, the DVI document discloses: a transmitter (Fig. 3.1. on page 24, TMDS Transmitter side); a receiver (Fig. 3.1 on page 24, on page 34, TMDS receiver side); and a TMDS-like communication link between the transmitter and the receiver, wherein "TMDS" denotes "transition minimized differential signaling," (see Fig. 3.1. TMDS link between the transmitter and receiver) the link has multiple data transmission channels (see Fig.3.1. Channels 0-2, and channel C, DDC and Hot Plug link (not shown in Fig. 3.1) but mentioned in sections 2.2.6 on page 15, and section 2.2.9 starting on page 16), the transmitter is configured to transmit video data to the receiver over at least a first channel of the link (see Fig. 3.1., see input video pixel data to the transmitter and data channels 0-2), and at least one of the transmitter and the receiver is configured to transmit a first stream of auxiliary data over a second channel of the link to the other one of the transmitter and the receiver (see Fig. 3.1, channel C, the CLK channel, that transmits the clock from the transmitter to the receiver and here the clock signal is considered as an auxiliary data), and at least one of the transmitter and receiver is configured to transmit a second stream of auxiliary data over one of the first channel of the link and a third channel of the link to the other one of the transmitter and the receiver (a third channel used to send configuration information from the receiver (monitor) to the transmitter (computer) over the DDC link).

With respect to claim 74, all of the limitations of claim 74 are analyzed above in claim 68.

With respect to claim 76, all of the limitations of claim 76 are analyzed above in claim 68, and the DVI document discloses: wherein the TMDS-like communication link is a Digital Video Interface link (the entirety of the DVI document relates to DVI and DVI interfaces).

With respect to claim 81, all of the limitations of claim 81 are analyzed above in claim 68, and the DVI document discloses: wherein the transmitter has a first operating mode in which it transmits the first stream of auxiliary data over the second channel (when the receiver is connected and powered-up the CLK signal (auxiliary data) is sent over the link), and the transmitter has another operating mode in which it does not transmit the first stream of auxiliary data over the second channel (when the receiver (monitor) is removed, then no data from the transmitter is sent over any links, see page 17, second paragraph "Monitor Removal").

With respect to claim 86,the DVI document discloses: (a) transmitting video data over at least a first channel of the link (see Fig. 3.1 video data is transmitted over channels 0-2) ; (b) transmitting a first stream of auxiliary data over a second channel of the link (see Fig. 3.1, channel C, that contains the clock signal and is considered to be an auxiliary signal); and (c) transmitting a second stream of auxiliary data over one of

the first channel of the link and a third channel of the link (not shown in Fig. 3.1, but the third channel corresponds to the DDC link, between the transmitter and receiver, and the receiver sends system capabilities/configuration information to the transmitter, more details mentioned in sections 2.2.6 on page 15, see also last paragraph of page 10, information about DDC), wherein step (a) includes the step of transmitting the video data in a forward direction over the link (forward direction corresponds to the transmitter sending information to the receiver), step (b) includes the step of transmitting the first stream of auxiliary data in the forward direction over the link (the clock is sent from the transmitter to the receiver), step (c) includes the step of transmitting the second stream of auxiliary data in a reverse direction over the link (the receiver (monitor) configuration/capabilities information is sent from the receiver to the transmitter).

With respect to claim 95, the DVI document discloses: a transmitter (Fig. 3.1. on page 24, see TMDS transmitter side); a receiver (Fig. 3.1 on page 24, see TMDS Receiver side) ; and a TMDS-like communication link between the transmitter and the receiver, wherein "TMDS" denotes "transition minimized differential signaling," (see Fig. 3.1, TMDS link between the TMDS Tx, Rx) the link has multiple data transmission channels (see data channels 0-2,and clock channel "channel C" as shown in Fig. 3.1, but also channels DDC, Hot Plugging, analog line (for power management) are also present (not shown in Fig. 3.1) but mentioned in sections 2.2.6, 2.2.9, & 2.4) the transmitter is configured to transmit video data to the receiver over at least a first channel of the link (see Fig. 3.1., and section 3.1.1. on page 24, video pixel data are

transmitted over the TMDS data channels), the transmitter and the receiver are configured to operate in a first mode in which one of the transmitter and the receiver asserts a signal indicative of auxiliary data over a second channel of the link to the other one of the transmitter and the receiver (see page 10, last paragraph the transmitter queries the monitor – so that the monitor capabilities (pixel format and interface) are determined, therefore it is interpreted that a signal indicative of auxiliary data is sent over the DDC link) and the transmitter and the receiver are configured to operate in a second mode in which said one of the transmitter and the receiver asserts a second signal over the second channel to the other one of the transmitter and the receiver (the second mode corresponds to the receiver (monitor) "replying" to the transmitter inquiry about its system capabilities (auxiliary data) over the DDC link).

With respect to claim 99, the DVI document discloses: an input for receiving auxiliary data(system of Fig. 3.1 on page 24 TMDS receiver side, specific input not shown in Figure, auxiliary data corresponds to monitor system capabilities information that is available to the receiver (the receiver is associated with a monitor)) ; a video input configured to be coupled to a video channel of the link (see Fig. 3.1 video inputs associated with any one of the video data channels 0-2, that include video pixel data from the TMDS transmitter); an output configured to be coupled to another channel of the link (not shown in Fig. 3.1, but this is the DDC link where the monitor capabilities (auxiliary data) are sent to the transmitter); circuitry, coupled to the output, and configured to operate in a first mode in which it asserts a signal indicative of the

auxiliary data to the output (not shown but this corresponds to the transmission of the system information over the DDC link and EDI data structure is used therefore circuitry that generates the EDID data structure is present), and to operate in a second mode in which it asserts to the output a signal indicative of presence of a device coupled to the receiver (the Hot Plugging link, indicating to the transmitter the attachment or removal of a monitor).

13. Claim 35 is rejected under 35 U.S.C. 102(e) as being anticipated by Grigorian (U.S. 6,724,432).

With respect to claim 35, Grigorian discloses: a first input for receiving auxiliary data (Fig. 1, see element 14, "Microphone" of the transmitting side signal "Audio In", the microphone provides the audio signal (audio signal is considered as the auxiliary data)); at least one video input for receiving video data (Fig. 1, element 13, providing the video signal "Video In"); an output configured to be coupled of a channel of the link (see Fig. 1, output of block 11 modulator/transmitter is coupled to the video cable/channel, element 34); and circuitry coupled to the first input and configured and configured for generating an output signal in response to the auxiliary data and asserting the output signal to the output for transmission over the channel (see Fig. 1, elements inside the modulator 11, including the "Audio Amplifier", element 16, the analog switch, element 17, see column 3, lines 32-54) wherein the output signal is indicative of the stream of binary data words that determine an analog auxiliary signal as well as video data, wherein the analog auxiliary signal is auxiliary data (see column 4, lines 1-4 and Fig. 2

where the analog audio signal (i.e. the analog auxiliary signal) and the video signal are combined, and Figs.4, 5 show examples of the combined signal (data word) (video and audio (auxiliary signal)) where the claimed binary data words correspond the video and audio pulses).

14. Claims 1-2, 5, 8-10, 12, 15-17, 36-37, 41, 43-44, 46, 51, 57,59, 65-66, 68-72, 76-78,81, 86, 89-90, 95, 99, 101, 106-107, 110-111, 125, 130 are rejected under 35 U.S.C. 102(e) as being anticipated by Pasqualino (U.S. 2002/0163598).

With respect to claim 1, Pasqualino discloses: a transmitter (see Fig. 2 , general architecture of a transmitter see paragraph [0014] and paragraph [0047] where examples of transmitters (video generation devices) are given, (PC, DVD player etc..)); a receiver (Fig. 3, general architecture of a receiver, see paragraph [0015] and paragraph [0047], where the receiver is a display device (for example a computer monitor)); a TMDS-like communication link between the transmitter and receiver, wherein the "TMDS" denotes "transition minimized differential signaling" the transmitter is configured to transmit video data over the link to the receiver (see Fig. 2 transmitter side block 212 "Optional HDCP Encryption Engine" and "TMDS Link" and Channels 0,1,2 and Channel C paragraphs [0053] and [0057] where the transmitter (system) complies with the DVI 1.0 standard (that uses TMDS signaling) where the encrypted TMDS link is considered as the TMDS-like communication link) , and the transmitter is configured to transmit auxiliary data to the receiver by modulating DC disparity of a channel of the communication link (the auxiliary data transmitted by the transmitter

correspond to the tenth bit of the TMDS encoded signal, which indicates whether an inversion has been performed so that the transmitted stream is approximately DC-balanced (and this is further explained in the DVI 1.0 standard)).

With respect to claim 2, all of the limitations of claim 2, are analyzed above in claim 1, and Pasqualino discloses: wherein the transmitter is configured to transmit a stream of encoded data words over the channel (see Fig. 2, channels 0 through 2 are used for data transmission using TMDS signaling and stream 216 is the video input stream) the words determine the video data and include bits indicative of the accumulated DC disparity of the stream, and said bit determine the auxiliary data (based on the DVI 1.0 specification, the transmitted output is a 10-bit TMDS DC balanced character (and the 10th bit indicates whether an inversion of 8 data bits has taken place) and the inversion (or not) of data bits takes place based on the number (disparity) of "1"s and "0"s of the code word (for example if too many "1"'s have been transmitted and the input contains more "1"s than "0"s then inversion of the code word is performed) and this corresponds to the "accumulated" (or overall) DC disparity), and the said bit (10th bit of the TMDS character) determine the auxiliary data since it indicates (to the receiver) whether an inversion or not has taken place).

With respect to claim 5, all of the limitations of claim 5 are analyzed above in claim 1, and Pasqualino discloses: wherein a sequence of instantaneous values of

the DC disparity determines the auxiliary data (see above claim 2 rejection where the number of "1" s and "0" of the TMDS code word determines whether an inversion or not takes place as indicated by the 10^{th} bit of the TMDS word).

With respect to claim 8, all of the limitations of claim 8, are analyzed above in claim 1, and Pasqualino discloses: wherein the auxiliary data determine at least one control signal (since the bit indicating whether an inversion or not has taken place in the encoded TMDS word (that is transmitted to the receiver) corresponds to the auxiliary data, when the receiver receives the TMDS encoded word the 10^{th} bit indicates whether or not the original 8 bit data word was inverted, and therefore, the auxiliary data (10^{th} bit of the TMDS word) is considered to determine at least one control signal since it indicates to the receiver whether an inversion or not has to be performed (to undo the inversion performed at the transmitter side).

With respect to claim 9, all of the limitations of claim 9, are analyzed above in claim 1,and Pasqualino discloses: wherein the auxiliary data are indicative of configuration information (broadly interpreted the "configuration information" corresponds to information relating to the inversion or not of the transmitted TMDS character and the auxiliary data (10^{th} bit) indicates whether or not an inversion has taken place).

With respect to claim 10, Pasqualino discloses: a transmitter (see Fig. 3, general architecture of a transmitter see paragraph [0014] and paragraph [0047] where examples of transmitters (video generation devices) are given, (PC, DVD player etc..)); ; a receiver (Fig. 3, general architecture of a receiver, see paragraph [0015] and paragraph [0047], where the receiver is a display device (for example a computer monitor)); and a TMDS-like communication link between the transmitter and the receiver, wherein "TMDS" denotes "transition minimized differential signaling," the transmitter is configured to transmit video data over the link to the receiver (see Fig. 2 transmitter side block 212 "Optional HDCP Encryption Engine" and "TMDS Link" and Channels 0,1,2 and Channel C paragraphs [0053] and [0057] where the transmitter (system) complies with the DVI 1.0 standard (that uses TMDS signaling) where the encrypted TMDS link is considered as the TMDS-like communication link), at least one of the transmitter and the receiver is configured to transmit a stream of data words determining auxiliary data over the link to the other one of the transmitter and the receiver (transmitter, the stream of transmitted TMDS encoded words that include the DC balancing bit (that indicates whether an inversion or not of the code word has taken place), and a data structure of each of at least a subset of the words is indicative of DC disparity (the data structure here corresponds to the specific bit i.e. the 10^{th} bit of all of the encoded TMDS code words, and the 10^{th} bit indicates whether an inversion or not has taken place so that the DC disparity of the transmitted TMDS code word is balanced) and wherein the auxiliary data are determined by one of a sequence of values of the DC disparity and a sequence of differences between successive ones of

the values of the DC disparity (see the first one, i.e. the auxiliary data are determined by a sequence of values of the DC disparity, since the value of the 10^{th} bit of each TMDS code word is determined based on the number (DC disparity) of "1"s and "0"s of the transmitted TMDS code word).

With respect to claim 12, all of the limitations of claim 12, are analyzed above in claim 10, and Pasqualino discloses: wherein the transmitter is configured to transmit the stream of encoded data words over a channel of the link, the data words of the stream are encoded data words that determine the video data and have an accumulated DC disparity (DVI 1.0 standard, the TMDS code word includes the 10^{th} bit that has a value based on the number of "1"s and "0" of the data word, (the DC balancing bit), each said data structure has at least one bit indicative of a value of the accumulated DC disparity (mentioned above, the DC disparity bit, that is used to DC balancing the accumulated DC disparity – depending on the number "1"s and "0"s of the data word), and a sequence of instantaneous values of the accumulated DC disparity determines the auxiliary data (the instantaneous values of the accumulated DC disparity correspond to every 8-bit data word that is TMDS encoded into a 10-bit word and includes a DC balancing bit (the 10^{th} bit) and the DC balancing bit corresponds to the auxiliary data).

With respect to claim 15, Pasqualino discloses: transmitting a stream of data words over at least one channel of the link thereby modulating DC disparity of the channel, such that the DC disparity is indicative of auxiliary data (Fig. 2 transmitter,

using the DVI 1.0 standard for transmission, where the DVI standard includes the DC-balancing bit (10^{th} bit) indicative of the DC disparity and is considered as auxiliary data since it indicates whether or not an inversion of the 8-bit data word has taken place); (b) recovering the auxiliary data from the transmitted stream of data words (Fig. 3, the receiver, receives/recovers the 10-bit TMDS code word and the 10^{th} bit indicates whether an inversion or not has taken place).

With respect to claim 16, all of the limitations of claim 16, are analyzed above in claim 15, and Pasqualino discloses: wherein the data words are encoded words indicative of video data, and also including the step of: (c) decoding the transmitted stream of data words to recover the video data (see Fig. 3, the receiver that can be a computer monitor, see the DVI-CE Recovered Streams, where video data are recovered/decoded).

With respect to claim 17, all of the limitations of claim 17 are analyzed above in claim 15, and Pasqualino discloses: wherein the data words include disparity bits indicative of accumulated DC disparity of the stream, and wherein step (b) includes the step of recovering the auxiliary data from the disparity bits of the transmitted stream of data words (the dc-balancing bits of each transmitted 10-bit TMDS code word that indicate (to the receiver) whether or not an inversion was performed at the transmitter and this information (indication of whether or not an inversion has taken place) is considered auxiliary data).

With respect to claim 36, Pasqualino discloses: a receiver (Fig.3, is the receiver side); a transmitter (Fig.2, is the transmitter side); and a TMDS-like communication link between the transmitter and the receiver, wherein "TMDS" denotes "transition minimized differential signaling" (the TMDS link between the Tx and Rx side that also includes the optional HDCP encoding), the transmitter is configured to video data over the video data over the link to the receiver (see Fig. 2 video input format 216 , eventually transmitted over channels 0-2 (see Fig. 7 where video data are transmitted when DE signal is high also paragraph [0090]) the link includes at least one multi-purpose line (Fig. 2 and Fig. 3 show DDC line, used for bi-directional communication see according to the DVI standard see paragraph [0005], using the EDID and DDC2B protocols and see paragraph [0054] the DDC link is used to communicate audio configuration information), the transmitter and the receiver are operable in a first mode in which one of the transmitter and the receiver transmits a first signal indicative of auxiliary data over the at least one multi-purpose line to the other one of the transmitter and the receiver (see paragraph [0054] transmission of the audio configuration information from the transmitter to the receiver via the DDC link), and the transmitter and the receiver are operable in a second mode in which one of the transmitter and the receiver transmits a second signal over the at least one multi-purpose line to the other one of the transmitter and the receiver (see paragraph [0005] use of the DDC link to transmit the EDID and DDC2B protocols according to the DVI 1.0 standard where the receiver system capabilities are determined).

With respect to claim 37, all of the limitations of claim 37 are analyzed above in claim 36, and Pasqualino discloses: wherein the at least one multi-purpose line is at least one downstream device status line (this corresponds to the DDC line), the second mode is a monitoring mode in which the transmitter monitors the at least one downstream status line to determine whether a downstream device is coupled to the receiver, and the first mode is an auxiliary data transmission mode in which the transmitter transmits the first signal over the at least one downstream status line to the receiver.

With respect to claim 36, Pasqualino discloses (this is a different interpretation of the 2002/0163598): a receiver (Fig.3, is the receiver side); a transmitter (Fig.2, is the transmitter side); and a TMDS-like communication link between the transmitter and the receiver, wherein "TMDS" denotes "transition minimized differential signaling" (the TMDS link between the Tx and Rx side that also includes the optional HDCP encoding), the transmitter is configured to video data over the video data over the link to the receiver (see Fig. 2 video input format 216 , eventually transmitted over channels 0-2 (see Fig. 7 where video data are transmitted when DE signal is high also paragraph [0090]) the link includes at least one multi-purpose line (see any one of Channels 1&2 and 0 as shown in Fig. 7, they are considered as multi-purpose lines since they can be used to transmit video and audio data as shown in Fig. 7), the transmitter and the receiver are operable in a first mode in which one of the transmitter and the receiver

transmits a first signal indicative of auxiliary data over the at least one multi-purpose line to the other one of the transmitter and the receiver (see Fig. 7, when the signal A_DE is high but signal DE is low, audio data is transmitted over channel 1&2), and the transmitter and the receiver are operable in a second mode in which one of the transmitter and the receiver transmits a second signal over the at least one multi-purpose line to the other one of the transmitter and the receiver (see Fig. 7, when DE is high and A_DE is also high video data are transmitted over Channel 1&2 and 0).

With respect to claim 41,all of the limitations of claim 41 are analyzed above in claim 36, and Pasqualino discloses: wherein the auxiliary data are digital audio data (see second sentence of paragraph [0125] where digital audio transmission is mentioned).

With respect to claim 43, Pasqualino discloses: a receiver (see Fig. 3, paragraph [0015] and [0047]); a transmitter (Fig. 2, paragraph [0014] and [0047]); and a TMDS-like communication link between the transmitter and the receiver, wherein "TMDS" denotes "transition minimized differential signaling," (see Fig. 2 transmitter side block 212 "Optional HDCP Encryption Engine" and "TMDS Link" and Channels 0,1,2 and Channel C paragraphs [0053] and [0057] where the transmitter (system) complies with the DVI 1.0 standard (that uses TMDS signaling) where the encrypted TMDS link is considered as the TMDS-like communication link) the transmitter is configured to transmit video data over a video channel of the link to the receiver (see Fig. 2, 216

"video input format"), wherein the link includes an additional channel for bidirectional communication between the transmitter and at least one of the receiver and a device associated with the receiver (see Fig. 2, Fig. 3 DDC link, assuming a computer monitor corresponds to the receiver (see paragraph [0047])) and wherein at least one of the transmitter and the receiver is operable in a mode in which it transmits auxiliary data over the additional channel to the other one of the transmitter and the receiver (see paragraph [0054] where two possible cases are described and the above limitation corresponds to either one of the following: A) the receiver indicates its capabilities (i.e. auxiliary data indicating the receiver capabilities is transmitted to the transmitter) via the DDC link, or B)the transmitter notifies the audio configuration (i.e. auxiliary data relating to audio configuration is sent from the transmitter to the receiver) via the DDC link to the receiver)).

With respect to claim 44, all of the limitations of claim 44, are analyzed above in claim 43, and Pasqualino discloses: wherein the additional channel is a serial bus configured to allow bidirectional communication between the transmitter and a monitor associated with the receiver, including transmission from the receiver to the transmitter of monitor identification data specifying characteristics of the monitor (see paragraph [0005] the DDC2B protocol relating to the DDC bi-directional communication link shown in Fig. 2 and Fig.3 paragraph [0054] the capabilities (monitor identification see paragraph [0050] of the receiver are transmitted to the transmitter via the DDC link).

With respect to claim 46, all of the limitations of claim 46 are analyzed above in claim 43 and Pasqualino discloses: wherein the auxiliary data are audio data.

With respect to claim 51, Pasqualino discloses: a first input for receiving auxiliary data (see Fig. 2, TMDS transmitter, see (left side) input 217 ("Audio Input Interface Layer") receiving "Audio input Information" the audio data, paragraph [0058]); at least one video input for receiving video data (Fig. 2, left side input 215 ("Video Input Interface Layer", receiving the Video Input Format, see first sentence of paragraph [0059]); a first output configured to be coupled to the first video channel (see Fig. 2 and Fig. 7, any one of channels 0-2 since they are all used for video (transmission)) ; a second output configured to be coupled to the second video channel (Fig. 2,and Fig. 7, any one channels 0-2 except for the one picked as the first video channel); and circuitry, coupled to the first input and to the video input (see Fig. 2, element 214, (see Fig. 6 for more details of the frame reformatter 214), and configured to operate in a selected one of a first mode and a second mode (see Fig. 7, modes are defined by the state of signal A_DE high/low and DE high/low), wherein the circuitry in the first mode generates a video signal and a second video signal each indicative of at least some of the video data (see Fig. 7, when A_DE and DE are high, Channel 0 (this could be the first video channel and Channel have video signals) , asserts the video signal to the first output for transmission over the first video channel (Fig. 7 video transmitted over Channel 0 when DE and A_DE are high) , and asserts the second video signal to the second output for transmission over the second video channel (see video data of channel 1 when DE and

A_DE are both high), and wherein the circuitry in the second mode (when A_DE is high but De is low see Fig. 7) generates a video signal indicative of at least some of the video data and an auxiliary data signal indicative of at least some of the auxiliary data (see video related signals HSYNC, VSYNC of Channel 0 shown in Fig. 7 and Audio data of Channel 1), asserts the video signal to the first output for transmission over the first video channel (Fig. 7, HSYNC, VSYNC transmitted over Channel 0), and asserts the auxiliary data signal to the second output for transmission over the second video channel (Fig. 7, Audio Data of Channel 1).

With respect to claim 57, Pasqualino discloses: a receiver (Fig. 3); a transmitter (Fig. 2); and a TMDS-like communication link between the transmitter and the receiver (see Fig. 2, Fig. 3 link between Fig. 2, Fig. 3 is a TMDS link with optional HDCP encryption), wherein "TMDS" denotes "transition minimized differential signaling," the link comprises at least one video channel (see Fig. 2, at least one of Channels 0-2 is a video channel (Fig. 7 shows the channels 0-2 used for video transmission)) , the transmitter is configured to transmit video data and auxiliary data to the receiver over the video channel (Fig. 7, see "video data", and "audio data" transmitted over channels 0-2), the video data are determined by a first set of code words (see Fig. 6, pixel data 25 bit words), the auxiliary data are determined by a second set of code words (Fig. 6, audio words out of Error correction blocks i.e the audio data is error corrected unlike the video data, see paragraph [0125]), and none of the code words in the second set is a

member of the first set (see Fig.,6 output mux selecting the 24-bit pixel data or the 24 bit signal including the audio data).

With respect to claim 59, claim 59 is rejected similarly to claim 57 and with respect to the limitations: a first input for receiving auxiliary data (see Fig. 6, auxiliary data are the audio related data, ACLK, and Audio Input Format the are Audio Packed by block 614) a video input for receiving video data (Fig. 6, and Fig. 2, show a (video) pixel data 24-bit input ; an output configured to be coupled to a channel of the link (see outputs of the DVI transmitter shown in Fig. 6).

With respect to claim 65, Pasqualino discloses: at least one auxiliary data input for receiving auxiliary data (see Fig. 2, input of transmitter receiving Audio Input Format, and see Audio data 16 bits as a DVI-CE Input stream); at least one video input for receiving video data (see Fig. 2, "Video Input Format", and Video Pixel Data (24-bits) as a DVI-CE Input Stream); at least one first channel output configured to be coupled to a first channel of the link (see Fig. 2, for example Channel 0); at least one second channel output configured to be coupled to a second channel of link (see Fig. 2, Channel 1); at least one third channel output configured to be coupled to a third channel of the link (see Fig. 2, Channel 2); circuitry coupled between the video input and the first channel output (Fig. 2, blocks 214 (Frame Reformatter) , 212 (optional encryption) and 210 (DVI Transmitter)), , and configured to assert a first signal indicative of at least some of the

video data to the first channel output in response to the video data (see Fig. 7, "Video Data" transmitted over Channel 0); circuitry coupled between the second channel output and at least one of said auxiliary data input, and configured to assert a second signal indicative of a first stream of the auxiliary data to the second channel output in response to the auxiliary data (Fig. 2, blocks 214, 212 and 210, and see Fig. 7, Audio Data, transmitted over Channel 1); and circuitry coupled between at least one of said auxiliary data input and at least one of the first channel output and the third channel output, and configured to assert a third signal indicative of at least one of a second stream of the auxiliary data and the first stream of auxiliary data to said at least one of the first channel output and the third channel output in response to the auxiliary data (see Fig. 2, blocks 214, 212, 210, and Fig. 7, Fig. 7, channel 2, transmission of Audio Data (auxiliary data)).

With respect to claim 66, all of the limitations of claim 66 are analyzed above in claim 65 (auxiliary data are Audio Data).

With respect to claim 68 Pasqualino discloses: a transmitter (Fig. 2); a receiver (Fig. 3); and a TMDS-like communication link between the transmitter and the receiver (Fig. 2,3,TMDS link between the Tx and Rx, with optional HDCP encryption), wherein "TMDS" denotes "transition minimized differential signaling," the link has multiple transmission channels (see Fig. 7, multiple transmission channels see channels 0-2, and (Channel C and DDC are shown in Fig.2 and 3), the transmitter is configured to

transmit video data to the receiver over at least a first channel of the link (see Fig. 7, video data transmission over channels 0-2), and at least one of the transmitter and the receiver is configured to transmit a first stream of auxiliary data over a second channel of the link to the other one of the transmitter and the receiver (see Fig. 7, transmitter send auxiliary data (see audio data) over any one of channels 0-2), and at least one of the transmitter and the receiver is configured to transmit a second stream of auxiliary data over one of the first channel of the link and a third channel of the link to the other one of the transmitter and the receiver (see Fig. 7, if the first channel is channel 0 (that also contains auxiliary signal timing signal Vsync Hsync, ctl, see Fig.7), the second channel is channel 1, then the third channel is channel 2).

With respect to claim 69, all of the limitations of claim 69 are analyzed above in claim 68 and Pasqualino discloses: wherein the auxiliary data are audio data (see Fig. 7, "Audio Data" this was mentioned also above in the rejection of claim 68).

With respect to clam 71, all of the limitations of claim 71, are analyzed above in claim 68, and Pasqualino discloses: wherein the first stream of auxiliary data is a stream of digital audio data (Fig. 7, see (channel 1) transmits "Audio Data"), the second stream of auxiliary data determines a clock for the stream of digital audio data (Fig. 7, the second channel (channel 2 the third channel), transmits "LineHdr" information (see Fig. 17 where the LineHdr contains information relevant to the recovery of ACLK –the audio system clock see first sentence of paragraph [0103]) the transmitter is configured

to transmit the stream of digital audio data over the second channel of the link to the receiver (see Fig. 7, Channel 1 sends Audio Data, paragraph [0125] mentions Digital Audio)), and the transmitter is configured to transmit the second stream of auxiliary data over the third channel of the link to the receiver (Fig. 7 see Channel 2 the third channel)

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With respect claim 72, all of the limitations of claim 72, are analyzed above in claim 68, and Pasqualino discloses: wherein the first stream of auxiliary data is a stream of digital audio data (Fig. 7, "Channel 1" the second link transmitting the first stream of auxiliary data transmits "Audio Data"), the second stream of auxiliary data is a second stream of digital audio data (see Fig. 7, "Channel 2" the third link transmits the second stream of auxiliary data "Audio Data"), the transmitter is configured to transmit the stream of digital audio data over the second channel of the link to the receiver, and the transmitter is configured to transmit the second stream of digital audio data over the third channel of the link to the receiver.

With respect to claim 76, all of the limitations of claim 76 are analyzed above in claim 68 and Pasqualino discloses: wherein the TMDS-like communication link is a Digital Video Interface link (DVI link see Fig. 2 and Fig. 3).

With respect to claim 77, all of the limitations of claim 77 are analyzed above in claim 76, and Pasqualino discloses: the transmitter is configured to transmit the first

stream of auxiliary data over the second channel of the link to the receiver (second channel is Channel 1, see Fig. 7, Audio Data (auxiliary data) is transmitted), the transmitter is configured to transmit the second stream of auxiliary data over the first channel of the link to the receiver (first channel is Channel 0 and the "Hsync, Vsycn, ctl (timing signals) are considered as the auxiliary data), the first channel is video channel of a first TMDS-link of the Digital Video Interface link, and the second channel is a video channel of a second TMDS-like link of the Digital Video Interface link (Fig. 7, Channels 0-2 are all video channels and Fig. 2, Fig. 3 show that the DVI interface).

With respect to claim 78, all of the limitations of claim 78 are analyzed above in claim 68, and Pasqualino discloses: wherein the transmitter is configured to transmit the first stream of auxiliary data to the receiver over the second channel of the link (Fig. 7, second link corresponds to "Channel 1" and the "Audio Data" corresponds to the auxiliary data stream), and the transmitter is configured to transmit the second stream of auxiliary data to the receiver over the first channel of the link (Fig. 7, the first channel corresponds to "Channel 0" and the auxiliary data is the "Hsync, Vsync,& ctl" (timing data)) at times when the transmitter does not transmit the video data over said first channel of the link (see Fig. 7, video data transmission takes place in "Channel 0" when DE and A-DE are both high, whereas the auxiliary data "Hsync, Vsync,& ctl" are transmitted over the first channel (Channel 0) when DE is low and A_DE is high and no video data transmission takes place when DE is low and A_DE is high).

With respect to claim 81, all of the limitations of claim 81 are analyzed above in claim 68, and Pasqualino discloses: wherein the transmitter has a first operating mode in which it transmits the first stream of auxiliary data over the second channel (Fig. 7, second channel is "Channel 1" and the first operating mode corresponds to the case where signal DE is low and A_DE is high and "Audio Data" (i.e. the auxiliary data) is transmitted), and the transmitter has another operating mode in which it does not transmit the first stream of auxiliary data over the second channel (see Fig. 7, "Channel 1", when signals DE and A_DE are both low Channel 1 has blanking periods (no auxiliary data is transmitted)).

With respect to claim 68, (this is a different interpretation of the reference since there is a plurality of channels that can be interpreted to send auxiliary data) Pasqualino discloses a transmitter (Fig. 2); a receiver (Fig. 3); and a TMDS-like communication link between the transmitter and the receiver (Fig. 2,3,TMDS link between the Tx and Rx, with optional HDCP encryption), wherein "TMDS" denotes "transition minimized differential signaling," the link has multiple transmission channels (see Fig. 7, multiple transmission channels see channels 0-2, and (Channel C and DDC are shown in Fig.2 and 3), the transmitter is configured to transmit video data to the receiver over at least a first channel of the link (see Fig. 7, video data transmission over any one of channels 0-2), and at least one of the transmitter and the receiver is configured to transmit a first stream of auxiliary data over a second channel of the link to the other one of the

transmitter and the receiver (see Fig. 7, transmitter send auxiliary data (see audio data) over any one of channels 0-2), and at least one of the transmitter and the receiver is configured to transmit a second stream of auxiliary data over one of the first channel of the link and a third channel of the link to the other one of the transmitter and the receiver (shown in Fig. 2 and Fig. 3, the DDC link between the Tx and Rx, see paragraphs [0005] and [0054] where according to the DVI 1.0 standard the DDC link is used to communicate system (monitor pixel resolution etc.) to the transmitter and paragraph [0054] mentions the DDC link used to send audio configuration information to the receiver (the information transmitted over the DDC link (third channel) is considered to be auxiliary data).

With respect to claim 70, all of the limitations of claim 70 are analyzed above in claim 68, and Pasqualino discloses: wherein the first stream of auxiliary data comprises audio data (see channels 0-2 of Fig. 7, transmit audio data) and the second stream of auxiliary data is data useful for negotiating operational parameters of at least one channel of the link (see DDC link already mentioned above in the rejection of claim 68, the DDC link is used for negotiating operational parameters).

With respect to claim 74, all of the limitations of claim 74 are analyzed above in claim 68, and Pasqualino discloses: wherein the transmitter is configured to transmit the first stream of auxiliary data over the second channel of the link to the receiver (see any one of channels 0-2 of Fig. 7 that transmit "Audio Data"), and the receiver is configured

to transmit the second stream of auxiliary data over the third channel of the link to the transmitter (the DDC link corresponds to the third channel and the receiver sends system information to the transmitter (paragraph [0005] and this is also found in the DVI 1.0 standard)).

With respect to claim 86, Pasqualino discloses: (a) transmitting video data over at least a first channel of the link (Fig. 2, transmitter, Channels 0-2 transmit video data to the receiver); (b) transmitting a first stream of auxiliary data over a second channel of the link (see Fig. 2, Channels 0-2 also contain Audio Data (auxiliary data) as seen in Fig. 7); and (c) transmitting a second stream of auxiliary data over one of the first channel of the link and a third channel of the link (Fig. 2,DDC link between transmitter and receiver, used for bi-directional communication of system capabilities), wherein step (a) includes the step of transmitting the video data in a forward direction over the link (Fig. 2, transmission from Tx to Rx), step (b) includes the step of transmitting the first stream of auxiliary data in the forward direction over the link (Fig. 7, audio data is transmitted from Tx to Rx), step (c) includes the step of transmitting the second stream of auxiliary data in a reverse direction over the link (the DDC link shown in Fig. 2 (and Fig. 3) is used to transmit receiver system information/capabilities (the receiver is usually associated with a computer monitor) to the transmitter (paragraph [0005] and DVI 1.0 standard)).

With respect to claim 89, Pasqualino discloses: a transmitter (see Fig. 2, showing the transmitter); a receiver (see Fig. 3, showing the receiver); and a TMDS-like communication link between the transmitter and the receiver, wherein "TMDS" denotes "transition minimized differential signaling," (TMDS link between Tx Rx with optional HDCP encryption) the link has multiple data transmission channels (see Fig. 2 and Fig. 3, Channels 0-2, Channel C, DDC link), the transmitter is configured to transmit video data to the receiver over at least a first channel of the link (see Fig.7, transmitter where any one of Channels 0-2 send video data) , and at least one of the transmitter and the receiver is configured to transmit a portion of a stream of auxiliary data over a second channel of the link to the other one of the transmitter and the receiver (see Fig. 7, Channel 1 corresponding to the second channel transmits and see Fig. 25-26 and paragraph [0159] the audio data is transmitted over different lines) and at least one of the transmitter and the receiver is configured to transmit another portion of the stream of auxiliary data over one of the first channel of the link and a third channel of the link to the other one of the transmitter and the receiver (see Fig. 7, Channel 2 corresponds to a third channel and also transmits a portion of auxiliary data , see Audio Data, and see Fig. 25-26, paragraph [0159] the audio data are transmitted over different lines).

With respect to claim 90, all of the limitations of claim 90 are analyzed above in claim 89.

With respect to claim 95, Pasqualino discloses: a transmitter (Fig. 2, showing transmitter side); a receiver (Fig. 3 shows receiver side); and a TMDS-like communication link between the transmitter and the receiver (TMDS link between Tx and Rx of Fig. 2 and 3), wherein "TMDS" denotes "transition minimized differential signaling," the link has multiple data transmission channels (see Fig. 2 multiple transmission channels 0-2 and channel C, and DDC link), the transmitter is configured to transmit video data to the receiver over at least a first channel of the link (see Fig. 7, Channel 0, transmits "Video Data"), the transmitter and the receiver are configured to operate in a first mode in which one of the transmitter and the receiver asserts a signal indicative of auxiliary data over a second channel of the link to the other one of the transmitter and the receiver (see Fig. 7,first mode corresponds to when the signal DE is low and A_DE is high and auxiliary data (the Audio Data) is transmitted over Channels 1&2), and the transmitter and the receiver are configured to operate in a second mode in which said one of the transmitter and the receiver asserts a second signal over the second channel to the other one of the transmitter and the receiver (see Fig. 2, second mode corresponds to when both signals DE and A_DE are high and Video Data are transmitted over Channels 1&2).

With respect to claim 99, Pasqualino discloses: an input for receiving auxiliary data (see Fig. 2, input receiving audio data); a video input configured to be coupled to a video channel of the link (see Fig. 2, input of transmitter receiving video pixel data and any one of channels 0-2 transmitting video signals (shown in Fig. 7)) an output

configured to be coupled to another channel of the link (see Fig. 2 other channels 0-2 or channel C or DDC link); circuitry coupled to the output, and configured to operate in a first mode in which it asserts a signal indicative of the auxiliary data to the output, and in a second mode in which it asserts to the output a signal indicative of presence of a device coupled to the receiver (see Fig. 2, block 214, the DVI-CE Transmitter Frame Reformatter and Fig. 7 where mode 1 corresponds when DE is low and A_DE is high and auxiliary data (audio) is sent to Channels 1&2 and mode 2 corresponds to when both DE and A_DE are high and video data is transmitted to Channels 1&2 and this occurs only when a device is coupled to the receiver (monitor) therefore transmitting the video data is indicative of the presence of a device coupled to the receiver (an attached monitor))

With respect to claim 101, Pasqualino discloses: a transmitter (Fig. 2, transmitter); a receiver (Fig. 3, receiver); and a TMDS-like communication link between the transmitter and the receiver (see TMDS link (Fig. 2, and Fig. 3) with optional encryption between the Tx and Rx), wherein "TMDS" denotes "transition minimized differential signaling," the link has multiple data transmission channels (see Fig. 2, and Fig. 3, any one of Channels 0-2, Channel c, DDC link), the transmitter is configured to transmit video data to the receiver over at least a first channel of the link (see Fig.7, video data transmission over any one of Channels 0-2), and at least one of the transmitter and the receiver is configured to transmit auxiliary data over a second channel of the link (see Fig.7, (transmitter) Channel 1 corresponds to the second

channel, includes Audio Data (auxiliary data) to be sent to the receiver) , to the other one of the transmitter and the receiver, while at least one of the transmitter and the receiver asserts a signal over the second channel (see Fig. 7, Channel 1, during the period for audio transport, the transmitter also asserts signal LineHdr).

With respect to claim 106 Pasqualino discloses: a transmitter (Fig. 2, TMDS transmitter); a receiver (Fig. 3, TMDS receiver); and a TMDS-like communication link between the transmitter and the receiver (see Fig. 2,3, TMDS link between Tx and Rx), wherein "TMDS" denotes "transition minimized differential signaling," the link comprises at least one video channel, the transmitter is configured to transmit data to the receiver over the link during data transmission periods separated by blanking intervals (see Fig. 7, Channels 1-2, "Video Data", and auxiliary data (corresponding to the data transmitted over the period for audio transport) are separated by blanking periods) wherein the data transmission periods include first periods each having duration within a first range (see Fig. 7, time during which video data are transmitted) and second periods each having duration within a second range distinct from the first range (see Fig.7, Period for Audio Transport), the transmitter is configured to transmit the video data to the receiver over the video channel only during the first periods and to transmit auxiliary data to the receiver over the video channel only during the second periods, the receiver is configured to recognize each of the second periods and operate in an auxiliary data reception mode during each of the second periods, and the receiver is configured to recognize each of the first periods and operate in a video data reception mode during

each of the first periods (Fig. 3,receiver, receives the time-multiplexed video and audio data).

With respect to claim 107, all of the limitations of claim 107 are analyzed above in claim 106 and Pasqualino discloses: wherein each of the first periods had duration greater than a first duration (see Fig. 4 and Fig 5 for comparison between prior art and the invention of Pasqualino, where the first duration correspond to the active video periods labeled total duration is labeled as 412 in Fig. 4) and each of the second periods has duration not greater than the first duration (and the Audio Data (auxiliary data) is transmitted during the audio data period shown in Fig. 5 which is a portion of the blanking period 400 shown in Fig. 4, also the video data are 24-bit whereas the auxiliary data audio are 16-bit Fig. 2)).

With respect to claims 110 and 111 these claims are rejected under a rationale similar to the one used to reject claim 106.

With respect to claim 125, Pasqualino discloses: a receiver (see Fig. 3, the receiver side of the invention); a transmitter (Fig. 2, the transmitter side); and a TMDS-like communication link between the transmitter and the receiver, wherein "TMDS" denotes "transmission minimized differential signaling" (see TMDS link between Fig. 2 and Fig. 3 Tx and Rx) the link comprises at least one video channel (see Fig. 2 and Fig.

3 Channels 0-2 are used for transmission of video data (see Fig. 7)) , the transmitter is configured to transmit video data and auxiliary data to the receiver over the video channel (see Fig. 7, where Channels 1&2 are used to transmit "Video Data", and "Audio Data" (the auxiliary data)) the video data determined by a first set of code words, the auxiliary data are determined by a second set of code words (see Fig. 6, the 24-bit video pixel data and the 16-bit audio data word combined with 8 bits of control and sync information), none of the code words in the second set is a member of the first set, and each of the code words in the second set is determined by a robust encoding algorithm (Fig. 6, audio data include 16-bit error corrected words plus 8 bits of sync and control bits, whereas the video data are the 24 bit pixel data).

With respect to claim 130, claim 130 is rejected similarly to claim 125, and with respect to the limitations: a video input for receiving video data (see Fig. 2, Transmitter side receives video input data); an auxiliary data input for receiving auxiliary data (Fig. 2 same transmitter receives audio related format (see clock 217)); an output configured to be coupled to a channel of the link (see Fig. 2, output(s) of "DVI 1.0 Transmitter" block 210);

15. Claims 112 is rejected under 35 U.S.C. 102(e) as being anticipated by Dickens et. al., (U.S. 6,618,774).

With respect to claim 112, Dickens et. al., discloses: a receiver (Fig. 7, element 100, computer end interface, column 22, lines 13-15); a transmitter (Fig. 7, element 101

the user-end interface unit, 101, column 22, lines 13-15); and a TMDS-like communications link between the transmitter and the receiver, wherein "TMDS" denotes "transition minimized differential signaling" the link (Fig. 7, see twisted pairs between blocks 100 and 101, and the twisted pairs transmit differential signal, differential signaling i.e. TMDS like (but without the transition minimized part)) includes at least one conductor pair between the transmitter and the receiver (see Fig. 7, each one of the 702, 704 channels are conductor pairs), wherein at least one of the transmitter and the receiver is configured to transmit a differential signal to the other of the transmitter and the receiver over the conductor pair (see Fig. 7, signals 702, 704, and column 22, lines 30-33, the red and blue video signals are transmitted over twisted wired pair 702, 704, and see column 13, lines 56-59, where differential mode signals are used to transmit the video signals), and said at least one transmitter and the receiver is configured to transmit a signal indicative of auxiliary data to the other of transmitter and the receiver over the conductor pair by common mode modulation of said conductor pair (and see column 13, lines 44-48, audio signals as common mode signals).

Allowable Subject Matter

16. Claims 3, 6, 7, 11, 13, 14, 38, 39, 45, 46, 50, 58, 67, 73, 75, 79-80, 87-88, 96-98, 108-109, 121, 126-129,131, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. Claims 31-32, 34, 53-55, 60-62, 63, 64, 100, 124, 132-141, 142-143 (of the claims set 2/28/2006) are allowed as indicated in previous office action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is 571 272 5507. The examiner can normally be reached on MTWRF 8:30-17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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